Business Line Information

Another area of concern has been that the BCM does not include business line information at the CBG level. Therefore, the BCM's cost results for loop investment do not include the impact of business lines. The model does utilize an assumed level of business lines in the sizing and design of switching plant.

The BCM inputs will be expanded to accommodate business lines as a separate input by CBG. Therefore, when business line data becomes available by CBG, the BCM will be capable of immediately incorporating the data.

Currently, U S WEST is exploring direct third-party sources of business line data by CBG area. At this point, no suppliers of this data have been found. Additionally, U S WEST is working with other parties to develop statistical relationships between business line data and public data sources so as to derive business line data by CBG. However, using proprietary business line location information in both Colorado and California has produced no statistically reliable information to estimate the number of business lines by CBG.

In order to eliminate the possibility of calculating unduly high residential costs in some CBGs because of the exclusion of business lines, the BCM will include a filter to identify CBGs that have a high probability of being primarily business areas. These CBGs will be flagged and an assumed level of business lines will be included for network design purposes. This will assure that these areas do not falsely appear as high cost areas.

Engineering Assumptions

Additionally, there are three major areas where the engineering assumptions of the BCM will be modified: switching plant, distribution plant, and digital circuit equipment. First, the switching module changes will include multiple switch types to more closely reflect the switch application.

Second, distribution plant engineering will be altered to reflect the distribution demands of each CBG. Varying the distribution plant engineering assumptions in urban areas aligns the BCM engineering designs more closely with actual engineering practices in these areas.

Another distribution plant enhancement is that no copper distribution distances will exceed those specified by the user. The user will have a choice of 9,000 feet, 12,000 feet (the default), 15,000 feet, or 18,000 feet. The limitation of copper technology serving distance has the effect of producing multiple distribution areas within rural CBGs. This change also aligns the BCM more closely with actual engineering practices.

Digital Circuit Equipment

The last major area of change is that the costs for digital circuit equipment used in digital line carrier systems will reflect the fixed and variable nature of the costs. The last change ensures that the cost for DLC equipment properly reflects the effects of the equipment loading in each CBG.

There are a number of other changes being made to the BCM. The BCM will include costs of the local loop not currently reflected in the model, slope data will be added to the BCM inputs, and new variables that impact structure costs will be added for future use.

Other Enhancements

There are two other changes being made to the BCM that do not impact model results. These changes are designed

to make the BCM much more user friendly and to require fewer computer resources. The Excel version of the BCM is being changed to run as a single menu driven spreadsheet, that allows simplified input modification and provides a menu to select the states to process. Another version of the BCM is being developed using the Visual Basic computer language. This version will produce the same results as the Excel version of the BCM, however, it will run state-wide data using only 16 Meg of RAM, something not possible with the Excel version. However, its calculations will not be visible as in Excel.

Rebuttal of Dr. Mercer's Testimony

Q. **DID YOU REVIEW DR. MERCER'S DIRECT TESTIMONY IN THIS CASE?**

A. Yes.

Q. **HAVE YOU REVIEWED DR. MERCER'S MODEL?**

A. No. Despite USWC's request to review Dr. Mercer's model, a copy has not been provided. However, USWC believes Dr. Mercer has an obligation to document his

model and explain its operation beyond what is contained in his testimony.

Q. DOES HIS DIRECT TESTIMONY (PAGE 19, lines 7 to 10) CONCLUDE THAT THE ESTIMATED MONTHLY COST PER LINE OF BASIC LOCAL TELEPHONE SERVICE IN UTAH IS $14.83 AND THAT THE STATE-WIDE WEIGHTED AVERAGE LOOP COST IS $10.62?

A. Yes.

Q. IS THE COST OF SERVICE IN UTAH AS STATED IN DR. MERCER'S DIRECT TESTIMONY, THE SAME CONCLUSION FILED WITH THE FCC ON DECEMBER 1, 1995 AS PART OF THE BENCHMARK COST MODEL SPONSORED BY MCI, NYNEX, SPRINT, AND U S WEST?

A. No.

Q. HOW DOES IT DIFFER?

A. The Benchmark Cost Model produced a monthly cost for Utah of $28.01 using the ARMIS annual cost factor and $20.31 using the MCI/Hatfield annual cost factor. This report was filed with the FCC on December 1, 1995 as I mentioned previously. The model cost filed by Dr. Mercer in this case is $14.83.

Q. WHAT DO YOU MEAN BY THE MCI/HATFIELD ANNUAL COST FACTOR?

A. As I explained earlier in this testimony, the BCM utilizes an annual cost factor to translate investment to a recurring cost. The MCI/Hatfield annual cost factor, filed with the FCC, utilizes a combination of historically derived expense/investment relationships combined with account specific expense levels derived from various studies. The historically derived relationships are based on national data, while the account specific expense data are derived from other sources that are not clearly documented and therefore not verifiable as to their accuracy or applicability. Additionally, several expense categories are excluded altogether, such as some customer operations expenses and marketing expenses. Dr. Mercer's Model filed in this proceeding uses similar expense methodology to the MCI/Hatfield factor. The primary differences are that the historically derived relationships are based on U S WEST Utah data and the overhead expenses are reduced from 10 percent to 6 percent.

Q. HOW DOES DR. MERCER'S MODEL UTILIZE THE BCM?

A. Based on Dr. Mercer's direct testimony, his model incorporates three of the four BCM modules into his

model calculations. The first module is the BCM input data, which assigns CBGs to the closest central office, determines the CBG's spatial relationship to the CBG, and lists the USGS terrain data associated with the CBG. The second module determines the feeder quadrant on which a CBG is served, the feeder plant distance, the distribution plant distance, and the terrain structure multipliers applicable to the CBG. The third module designs the feeder and distribution plant with the appropriate sharing of feeder plant, the associated structure, and the total investments involved for the major cost drivers contained in the model.

Q. WHAT CHANGES WERE MADE TO BCM AS IT IS INCORPORATED INTO DR. MERCER'S MODEL?

A. The one change to the BCM was to remove the switching and expense module and to utilize the intermediate results as input to Dr. Mercer's capital cost module. In the BCM modules utilized by Dr. Mercer, modifications were made to three input areas of the BCM -- adding business lines and additional residential lines, modifying fill factors, and lowering Digital Loop Carrier (DLC) prices. Additionally, by excluding the final module of the BCM, Dr. Mercer's modifications lowered switching prices and lowered the recurring

expenses associated with local service (when compared to the original MCI/Hatfield expenses utilized in the BCM). Additionally, Dr. Mercer added two investment amounts to represent the investment associated with drop wire and the network interface device.

Q. IN YOUR TESTIMONY ABOVE YOU ADDRESS FOUR REASONS WHY THE BCM DOES NOT DEFINE AN INDIVIDUAL COMPANY'S COSTS; DO ANY OF DR. MERCER'S MODIFICATIONS ADDRESS THESE CONCERNS?

A. No, none of the modifications made by Dr. Mercer address the issues of using the BCM to identify an individual company's cost of residential service. Hypothetical network costs cannot be used as tests for an individual company for cross-subsidy or price floors. The BCM is designed to identify high cost CBGs based on the most relevant cost factors, not to identify all the investment and direct expenses associated with a LRIC study. The additional investments for drop wire and network interface devices identified by Dr. Mercer do not address the urban distribution costs not identified by the BCM, nor is it clear that the investments for drop wire and network interface devices adequately reflect Utah-specific geography.

Q. IS THE HATFIELD MODEL A LRIC STUDY?

A. No, it is not. Dr. Mercer's model is not even consistent with the Consensus Pricing Principles which were agreed to by AT&T and other parties in Arizona. (Geri Santos-Rach has included the Consensus Costing Principles in her testimony as Exhibit GGSR-1). Other than using the forward-looking technologies in the BCM, the Hatfield model does not meet the requirements of a LRIC model -- even by the standards set forth in AT&T witness Pat Parker's direct testimony in Exhibit PAP-1.

First and foremost, Dr. Mercer does not present a long run view of demand for local loops. He uses a historical demand set forth in the FCC ARMIS reports. Additionally, Dr. Mercer modified the BCM's default inputs for the fill factors in the distribution plant so that there is no possibility to accommodate future growth (and probably not even the current year's access line demand.) This results in understating the true LRIC cost.

Second, most of the expense data used by Dr. Mercer is historically derived or not shown to be forward-looking in its application in Utah. The most glaring example of this type of expense is depreciation expense. Given the

competitive future of the telecommunications industry and the pace of technological change, an average plant life of 18 years in a forward-looking model is unrealistic. One can hardly imagine that any piece of plant or equipment put in place today would have any technological, economic usefulness or value in the year 2014.

In fact, both AT&T and MCI are on record supporting the use of forward-looking economic lives in TSLRIC studies. In Iowa Docket No. RPU-95-10, Dr. David Kaserman, responding for AT&T to the question of "In a properly conducted TSLRIC study should regulatorily prescribed depreciation rates or forward looking depreciation rates be used?", stated that, "Forward-looking depreciation rates should be used, because TSLRIC is a long-run concept that, by definition, is forward-looking." In the same docket Anthony J. DiTirro of MCI, answered "yes" to the question, "Given Mr. DiTirro's testimony, does MCI believe the use of economic depreciation lives is appropriate in a TSLRIC study?"

Lastly, Dr. Mercer does not include all the relevant costs of the local loop or basic service to be considered a LRIC study. I have previously discussed

some of the major costs, such as urban distribution plant costs, excluded by Dr. Mercer's model.

Q. DO THE INPUT MODIFICATIONS OF THE BCM IN DR. MERCER'S MODEL APPEAR REASONABLE?

A. Dr. Mercer's modifications seem to ignore the internal network structure in the BCM when making isolated changes to prices and other inputs. In other words, Dr. Mercer's modifications ignore the network assumptions used in the BCM in making price input changes. The input changes are outside of the range of reason when examined within the network logic of the BCM.

Q. CAN YOU GIVE AN EXAMPLE OF AN UNREASONABLE MODIFICATION OF A BCM INPUT MADE BY DR. MERCER IN HIS MOST RECENT UTAH COST STUDY?

A. Yes. The Digital Loop Carrier (DLC) investment and discount input changes made by Dr. Mercer are not consistent with the manner in which DLC equipment is included in the BCM. Dr. Mercer reduced the input for the list price for "SLC Series 2000" digital line carrier system by 50% from the default price and also doubled the default discount from the list price. These changes were made in isolation of the BCM logic for

utilizing DLC - type equipment. The BCM uses a DLC cost per line assuming that each DLC terminal is at its optimum fill. Obviously, not all DLC terminals are fully utilized, especially in rural areas. Therefore, Dr. Mercer's modifications produce unreasonably low investment for DLC equipment. The BCM logic would need to be changed to reflect the costs of individual terminals, not individual channels, as currently configured in the BCM, to reasonably utilize discounts of this magnitude.

Investment reductions of this nature have impacts far beyond the return on investment calculated by the model. For instance, the reduced DLC investment also drives reductions in circuit equipment maintenance expense, reductions in secondary support equipment investment, as well as reductions in depreciation expense, which is already too low because of an expected DLC equipment life of 18 years.

Q. WHAT IS THE IMPACT OF THE CHANGE?

A. The cost was reduced by 15 percent or $ 2.40 per month, using a comparable expense factor.

Q. YOU STATED EARLIER THAT DR. MERCER MODIFIED THE DEFAULT FILL FACTORS FOR DISTRIBUTION PLANT. WHAT IS THE IMPACT OF THAT MODIFICATION?

A. Dr. Mercer raised the default fill factors for five of the six distribution plant density groups. The categories, standard BCM fill factors and Dr. Mercer's changes are shown in the table below.

Households Per Square Mile (HH/SM)	BCM Fill Factor	Mercer Fill Factor
0 - 5	.25	.50
5 - 200	.35	.55
200 - 650	.45	.60
650 - 850	.55	.65
850 - 2550	.65	.70

As a result of Dr. Mercer's manipulation of fill factors, the BCM monthly cost for Utah decreases by $4.25, when using the ARMIS annual cost factor and decreases by $3.08, when using the MCI/Hatfield annual cost factor.

Q. DO YOU FEEL THAT DR. MERCER'S FILL FACTORS ARE ACHIEVABLE IN PRACTICE?

A. Any fill factor is generally achievable, however the implications of various fill factors can be serious. Placing new plant at Dr. Mercer's high utilization rates could lead to a premature exhaust of facilities, held orders and increased costs.

Q. CAN YOU PROVIDE ANOTHER EXAMPLE OF AN UNREASONABLE MODIFICATION OF THE A BCM INPUT MADE BY DR. MERCER IN HIS MOST RECENT UTAH COST STUDY?

A. Yes, the BCM only includes service to residential households, Dr. Mercer's model includes business lines.

Q. WHY DID THE DEVELOPERS OF THE BCM EXCLUDE BUSINESS LINES?

A. The Joint Sponsors wanted to include business lines in the BCM and explored numerous data sources and methods for estimation of these lines. However, none of the sources were capable of producing a reliable estimate of business lines by CBG. Third party data sources, such as Dunn and Bradstreet, include geocoded information on large businesses, but at best only include employee counts and standard industry codes. This information cannot be reliably converted to business line counts by CBG.

Q. HAVE YOU FOUND ANY OTHER METHODS THAT CAN REASONABLY ALLOW YOU TO PREDICT THE BUSINESS LINE COUNTS BY CBG?

A. No. Using proprietary business line data for USW, I found no statistical relationship between business lines and CBG household density or between business lines and other CBG characteristics. Additionally, Pacific Bell performed a similar analysis using their proprietary business data and found a very low statistical relationship between business lines and CBG characteristics.

Q. DOES THE EXCLUSION OF BUSINESS LINES INTERFERE WITH THE BCM'S STATED PURPOSE OF IDENTIFYING HIGH COST CBGS?

A. No. The Joint Sponsors feel that the impact of excluding business lines from the calculation of the benchmark cost in high cost CBGs is de minimus. The model enhancements to provide an input area for business lines, as data sources develop, and to filter CBGs with a high probability of being areas of high business line concentration will essentially eliminate the few business areas mis-identified as high cost CBGs.

Q. WHAT IS THE EFFECT OF DR. MERCER'S METHOD OF INCLUDING BUSINESS LINES IN THE CALCULATION OF THE BCM COST PER LINE?

A. Dr. Mercer used multipliers for each density group to include business and second residential lines. This calculation assumes that each CBG has a constant ratio of total lines to residence lines for any given density group. For example, in the lowest density range the Hatfield model assumes that business lines constitute approximately nine percent of the number of residence lines. Thus, if one were to find only 10 residential lines in a CBG in downtown Salt Lake City that had a low density of households per square mile, the Hatfield model would assume only one additional business line for that CBG, instead of the hundreds or thousands of business lines that actually exist there. This type of modification does not improve the BCM's accuracy, it does the opposite, by putting additional telephone plant in the wrong places.

The highest business line multiplier was used in the 1000 - 5000 population per square kilometer (KM^2) density group. This density group has 57 percent of the residential lines in the state, as well as a cost of 86 percent of the statewide average. The effect of

utilizing business lines in this manner is to lower the statewide monthly cost. As I stated earlier, I found no statistical relationship between CBG household density and business lines.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. The Joint Sponsors have developed the BCM to identify high cost Census Block Groups across the nation. Hatfield Associates have inappropriately incorporated the BCM into their own model. Dr. Mercer states their basic model uses a TSLRIC methodology for the development of the cost of basic local service as well as the local loop. My testimony demonstrates that Dr. Mercer's model is not a LRIC study of local service nor does it include all network costs associated with basic local service. Therefore, Dr. Mercer's estimates for the cost of basic local service and the cost of the loop are neither accurate or appropriate.

The four primary areas where Dr. Mercer's methodology is flawed follow:

- Long Run Access Line Demand is not included;
- Forward-looking expenses are not included;
- Major urban investments are excluded by inappropriately using the BCM; and

- Major investments are understated by inappropriately modifying BCM inputs.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

APPENDIX G

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26 April 1996

(Return Receipt Requested)
Lee Selwyn
Economics and Technology, Inc.
One Washington Mall
Boston, MA 02108

RE: COPYRIGHT LICENSE TO BENCHMARK COST MODEL

Mr. Selwyn:

The Joint Sponsors (MCI, NYNEX, Sprint, and U S WEST) of the Benchmark Cost Model computer program (BCM) jointly developed and own all rights in the BCM. A limited license to *use* the BCM was granted to Economics and Technology, Inc. (ETI) under the terms and conditions of a software license agreement (a blank copy is attached). The software license agreement specifically reserves all other rights in the BCM, including the right to modify the program.

It has recently come to our attention that ETI published a report titled "The Cost of Universal Service: A Critical Assessment of the Benchmark Cost Model" dated April 1996 (see attached excerpt). In the report ETI states on page 112, footnote 166, that "The Main Logic Sheet of the Loop Module where the copper/fiber crossover algorithm is found is password protected. *We were able to overcome this restriction.*" (emphasis added). Such modification to the BCM is strictly forbidden under the terms and conditions of the license agreement.

Therefore, we request that all modifications to the BCM be delivered to U S WEST or certified destroyed. We also request written assurances of such delivery or destruction, and further written assurances that ETI will adhere to the terms and conditions of the BCM software license agreement.

If you would like to discuss this matter further, please contact me. I look forward to your prompt written response.

Sincerely,

Judson D. Cary

enclosures: excerpt of "The Cost of Universal Service: A Critical Assessment of the Benchmark Cost Model"
Benchmark Cost Model Order Form and Software License

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April 26, 1996

bcc: File
Peter Copeland
Steve Jewett

CERTIFICATE OF SERVICE

I, Lea Ann M. Hauck, do hereby certify that on this 7th day of May, 1996, I have caused a copy of the foregoing **REPLY COMMENTS OF U S WEST, INC.** to be served via first-class United States Mail, postage prepaid, upon the persons listed on the attached service list.

Lea Ann M. Hauck

***Via Hand-Delivery**

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